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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,262	10/05/2005	Kazuhide Hasebe	33082M275	6774
441 7590 04/25/2008 SMITH, GAMBRELL & RUSSELL 1130 CONNECTICUT AVENUE, N.W., SUITE 1130 WASHINGTON, DC 20036				
EXAMINER				
VINILAN				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
04/25/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/552,262

**Applicant(s)**

HASEBE ET AL.

**Examiner**

LAN VINH

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 January 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-19 are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al (US 5,282,925) in view of Song et al (2004/0161890) and further in view of Demmin et al (US 6,635,185)

Jeng discloses a method for etching thin film comprises: forming silicon dioxide film and TEOS on a surface of a workpiece in a processing vessel that can be evacuated to 10<sup>-3</sup> Torr/below 7.6 Torr (col 13, lines 45-55; col 19, lines 55-60), using a mixed gas containing HF gas and NH<sub>3</sub> gas for etch/remove the silicon dioxide film, the amount of silicon dioxide being etched is controlled by altering the HF/NH<sub>3</sub>/selectively etching silicon dioxide (col 14, lines 45-55), the etching can be carried out over a wide range of chamber pressure (col 7, lines 15-20). Jeng also discloses heating the wafer to 200 degree C during etching (col 20, lines 35-45; fig. 6).

Unlike the instant claimed invention as per claim 16, Jeng fails to specifically disclose that the silicon dioxide film being a chemical oxide film that has been formed by a chemical process using a solution prepared by mixing H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH

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Song discloses a method for manufacturing a semiconductor device comprises the steps of forming an oxide layer via oxidation using H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH, processing the workpiece at a pressure of 0.05 to 2 Torr (page 2, paragraph 0021, paragraph 0023)

Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Jeng method by forming the silicon dioxide using a solution prepared by mixing H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH as conventional in the art as taught by Song

Jeng also fails to disclose the claimed flow rate ratio of HF to NH<sub>3</sub> and the processing pressure

Dennis teaches, beginning at col 7, lines 15

As is well known, there are many operating conditions of a plasma etching process that can have an effect on the results obtained. These conditions include, for example, the type of plasma etching (for example, reactive ion etching, plasma etching, and high-density etching), etching composition flow rate, wafer temperature, pressure, power, time, and bias. The interrelationship of these parameters is a function of the hardware configuration and the material being etched. One skilled in the art of plasma etching and cleaning can vary these parameters accordingly to etch a desired material satisfactorily. Exemplary operating conditions include etching gas flow rates from about 1 to about

Since Jeng specifically discloses that the amount of the oxide layer which is etched can be controlled by changing the ratio of HF to NH<sub>3</sub> (col 19, lines 1-5) and the etching can be carried out over a wide range of chamber pressure (col 7, lines 15-20), one skilled in the art at the time the invention was made would have found it obvious to vary the flow rate of NH<sub>3</sub> and HF/the processing pressure in Jeng method in view of Dennis teaching because Dennis teaches that one skilled in the art can vary the parameter accordingly to etch a desired material satisfactorily (col 7, lines 23-25). It is noted that "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover

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the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)" see MPEP 2144.05 II B

2. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng et al (US 5,282,925) in view of Song et al (2004/0161890) and further in view of Demmin et al (US 6,635,185)

Jeng discloses a method for etching thin film comprises: forming silicon dioxide film by CVD and TEOS on a surface of a workpiece in a processing vessel that can be evacuated to 10<sup>-3</sup> Torr (col 9, lines 55-60; col 13, lines 45-55; col 19, lines 55-60), which reads on a processing pressure is not more than 53, 200 Pa, using a mixed gas containing HF gas and NH<sub>3</sub> gas for etch/remove the silicon dioxide film, the amount of silicon dioxide being etched is controlled by altering the HF/NH<sub>3</sub>/selectively etching silicon dioxide (col 14, lines 45-55), the etching can be carried out over a wide range of chamber pressure (col 7, lines 15-20). Jeng also discloses heating the wafer to 200 degree C during etching/temperature for achieving etch selectivity (col 20, lines 35-45; fig. 6).

Unlike the instant claimed invention as per claims 17-18, 19, Jeng fails to specifically disclose that the silicon dioxide film being a chemical oxide film that has been formed by a chemical process using a solution prepared by mixing H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH

Song discloses a method for manufacturing a semiconductor device comprises the steps of forming an oxide layer via oxidation using H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH, processing the workpiece at a pressure of 0.05 to 2 Torr (page 2, paragraph 0021, paragraph 0023)

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Hence, one skilled in the art at the time the invention was made would have found it obvious to modify Jeng method by forming the silicon dioxide using a solution prepared by mixing H<sub>2</sub>O<sub>2</sub> and NH<sub>4</sub>OH as conventional in the art as taught by Song

Jeng also fails to disclose the claimed flow rate ratio of HF to NH<sub>3</sub>

Dennis teaches, beginning at col 7, lines 15

As is well known, there are many operating conditions of a plasma etching process that can have an effect on the results obtained. These conditions include, for example, the type of plasma etching (for example, reactive ion etching, plasma etching, and high-density etching), etching composition flow rate, wafer temperature, pressure, power, time, and bias. The interrelationship of these parameters is a function of the hardware configuration and the material being etched. One skilled in the art of plasma etching and cleaning can vary these parameters accordingly to such a desired material satisfactorily. Exemplary operating conditions include etching gas flow rates from about 1 to about

Since Jeng specifically discloses that the amount of the oxide layer which is etched can be controlled by changing the ratio of HF to NH<sub>3</sub> (col 19, lines 1-5) one skilled in the art at the time the invention was made would have found it obvious to vary the flow rate of NH<sub>3</sub> and HF/the processing pressure in Jeng method in view of Dennis teaching because Dennis teaches that one skilled in the art can vary the parameter accordingly to etch a desired material satisfactorily (col 7, lines 23-25). It is noted that "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)" see MPEP 2144.05 II B

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

#### ***Conclusion***

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/  
Primary Examiner, Art Unit 1792